The new construction vehicle family from Mercedes-Benz

Arocs – the new force in construction

- **16 power output levels from 175 kW (238 hp) to 460 kW (625 hp)**
- **PowerShift available as standard for the first time in a construction vehicle**
- **First electrohydraulic power steering system in a commercial vehicle**
- **Frames, axles, suspension, brakes: all optimised to match the job**
- **Seven cabs available in 14 variants**
- **Loader and Grounder: leading forces for special loads**
- **Special vehicles available direct ex-works**
- **Cab comfort and user-friendliness on a par with long-distance haulage vehicles**
- **Profitability: ecology meets economic efficiency**
- **All safety systems available**

Mercedes-Benz has achieved a triple leap forward in the field of Euro VI compliance: this year the brand with the star is expanding its current heavy-duty vehicle range with the addition of the Arocs. This specialist in construction follows hot on the heels of the Antos, which celebrated its market launch in the heavy-duty short-radius distribution sector in 2012, and the Actros, which celebrated its market launch in the long-distance transport sector in 2011. In addition to maximum environmental compatibility thanks to Euro VI, the new Arocs vehicles also boast three outstanding qualities: power, efficiency and strength.

Clear segments

The Arocs range is being offered in a previously unparalleled variety of vehicle models to precisely match customer requirements in this extremely diversified application sector. The new tippers, all-wheel drive tippers, concrete mixers, tractor units and rigid chassis are available as two, three and four-axle vehicles with 16 power output levels ranging from 175 kW (238 hp) to 460 kW (625 hp). From the outset, all of the engines have been designed to meet the future Euro VI emissions standard and are available to order as Euro VI versions.

On top of this, there is also a wide variety of requirements when it comes to the means of transport used in ancillary construction trades or the ultra-heavy-duty transport sector. Public service vehicle operators require tailor-made vehicles too.

Leading forces in construction: Loader and Grounder

With the new Arocs, transport tasks in the building industry can be carried out more efficiently than ever before. In order to be able to meet this requirement even more effectively for payload sensitive or extreme duty applications, the Arocs Loader and Arocs Grounder have been developed.

The Arocs Loader has made considerable saving to its own kerb weight. The result provides payload optimised 4x2 tractor units which are among the lightest vehicles in the construction sector, as well as 8x4/4 concrete mixers with the lowest possible kerb weight, able to transport the maximum amount of concrete on every trip.

The Arocs Grounder is designed for operating in extremely difficult conditions, such as in quarries or on building sites. Thanks to a host of technical measures, such as a longitudinal member thickness of 9 mm, it is extremely robust and also features particularly high levels of stability and a high load carrying capacity.

Broad range of vehicles from 18-tonnes and up

Both the Loader and Grounder belong to a broad collection of vehicles comprising the Arocs family and which range from a maximum gross vehicle weight of 18-tonnes in the case of the two-axle models, through to 41-tonnes or more for the off-road four-axle models making up the Grounder series.

In general, the Arocs construction vehicle family has been specifically designed for all types of construction industry applications. As a result, the range even includes road-biased tractor units, ideal for tipping trailers or recycling, as a separate vehicle rather than a variant of Actros.

Clear differentiation: high frame

The frames, frame heights and overhangs are specifically different from those found on long-haul trucks. As a result, matching conversion parts for use as construction material transporters are no longer required. The two-axle Arocs tractor unit can therefore be ordered as a 4x2 standard vehicle with steel or air suspension, a payload optimised 4x2 Arocs Loader, a 20-tonne heavy duty air suspended vehicle or a 4x4 as an 18-tonne vehicle or a 20-tonne heavy duty Arocs Grounder. Other specialist vehicles within the broad-based Arocs family include variants previously only available as subsequently converted vehicles. Four-axle vehicles now roll off the production line with a single front and three rear axles as part of a normal series production process in the world's largest truck plant in Wörth.

New ex-works: four-axle 8x4/4 single-tyred trailing axle with three rear axles

This four-axle vehicle is based on a three-axle vehicle with a non-driven steering axle and two twin-tyred driven rear axles. Added behind this is a single-tyred, liftable trailing axle with positive steering.

Possible areas of application include trucks with a large rear mounted loading crane for example, which are required to operate on their own. A three-axle vehicle, or even a classic four-axle variant, would not be able to cope with the rear position of the loading crane due to the load distribution. Thanks to the triple solution at the rear, however, all axle loads can be handled without a problem.

Drive systems: powerful Euro VI engines for the construction sector

The new Mercedes-Benz Arocs is available with a wide range of Blue-Efficiency Power diesel engines. From the very outset, Mercedes-Benz is setting the Arocs to work in harsh, everyday environments equipped with low-emission Euro VI engines.

Arocs customers can choose from a selection of 16 power output levels. The BlueTEC 6 engines are all designed as in-line six-cylinder engines with exhaust-gas turbocharging and charge air cooling for high torque at little more than idle speed. Maximum torque levels from 1,000 to 3,000 Nm are achieved by four displacements of 7.7-, 10.7-, 12.8- and 15.6-litres.

Brand new: the large-scale OM 473 in-line six cylinder engine

Also now available with the Arocs is the largest-capacity engine from Daimler's heavy-duty engine series which has been comprehensively redeveloped. Boasting specifications which include a displacement of 15.6-litres, output of up to 460 kW (625 hp) and maximum torque of 3,000 Nm, the new Mercedes-Benz OM 473 diesel engine sets its own powerful tone.

It is characterised by peak performance under harsh conditions – even when it comes to the most

demanding of requirements in terms of transport speed, tractive power and ruggedness. Top performance is also guaranteed for off-road applications, maximum loads in the heavy-duty transport sector, and high transport speed over routes with demanding topography. On top of all of this it also offers maximum durability. The new 15.6-litre OM 473 in-line six-cylinder engine is capable of maximum performance in every respect.

Power from the word go

When it comes to the heaviest-duty applications in particular - which the Grounder variants of the new Mercedes-Benz Arocs may face for example - the OM 473 scores highly with its torque. It is not only the numbers which are impressive – between 2,600 Nm and 3,000 Nm are fed to the crankshaft, depending on the variant – but also the way in which the torque is made available. This is because under full load, around 2,500 Nm are already available at a little more than idle speed in all rated output versions of the engine. This is a higher level of torque than the maximum achieved by most truck engines.

On the test bench, the highest torque of all of the OM 473 variants is available at 1,100 rpm. In the real world, almost the entire tractive power is available across a wide range from around 900 to 1,400 rpm. Immediately thereafter, the engines reach their maximum output.

This characteristic helps to ensure excellent driveability across a very wide engine speed range. In addition, all variants of the engine also feature a response to accelerator pedal input which is both spontaneous and powerful.

Spontaneous response, reduced fuel consumption under high load

One of the special features of the new Mercedes-Benz OM 473 engine is turbo-compound technology. The term turbo-compound stands for a second turbine, connected in series after the exhaust gas turbocharger. It also makes use of the available pressure of the exhaust after flowing through the exhaust gas turbocharger to further increase performance. This power is transferred to the engine's gear drive, and thereby directly to the crankshaft, via a shaft and hydrodynamic clutch.

Turbo-compound technology increases the output of the OM 473 by around 50 kW (68 hp). The driver is able to feel the additional performance immediately via the already spontaneous response of the engine at low engine speeds.

At the same time, a reduction in fuel consumption of around two per cent is achieved under high load. These demanding conditions are typical of the areas of application in which the OM 473 is used.

In addition, the new Mercedes-Benz OM 473 also impresses with its tremendous economic efficiency: even the most powerful engine of the new engine generation has been consistently developed for low fuel consumption. Depending on the version, consumption is between 0.5 and 1.5 per cent lower than the preceding model, the V8 Mercedes-Benz OM 502.

It also goes without saying that the engine features maximum environmental acceptability: all variants of the OM 473 meet the strict Euro VI emissions standard applicable to registrations from 2014 onwards.

The new OM 473 is available with three power output levels:

Power output	Maximum Torque
380 kW (517 hp) at 1,600 rpm	2,600 Nm at 1,100 rpm
425 kW (578 hp) at 1,600 rpm	2,800 Nm at 1,100 rpm

460 kW (625 hp) at 1,600 rpm	3,000 Nm at 1,100 rpm

OM 471: resilient, powerful and economical

Slotting in seamlessly below the new Mercedes-Benz OM 473 diesel engine is the previous top-of-the-range variant of the new engine generation, the OM 471, producing a maximum of 375 kW (510 hp) and 2,500 Nm of torque from a displacement of 12.8-litres.

This engine covers a broad range of applications within the new Arocs vehicle family. The long-stroke in-line six-cylinder engine (piston stroke: 156 mm, cylinder bore: 132 mm), which made its debut in the Actros long-distance truck, was the first model in a completely new engine generation in 2011.

Its effective full-load engine speed range extends down to around 800 rpm, which is particularly important for the off-road applications for which the Arocs may be used. The engines provide close to their full power output as low as 1,400 rpm.

Highly efficient turbocharging and engine brake

Turbocharging is dealt with by an asymmetrical turbocharger featuring fixed geometry. It ensures quick engine response to different accelerator pedal positions. Maximum efficiency is also achieved by the turbocharged decompression engine brake. Maximum braking power reaches 400 kW in the case of the OM 471 and 475 kW for the OM 473.

The OM 471 is available with four power output and torque levels in the Mercedes-Benz Arocs:

Power output	**Maximum Torque**
310 kW (421 hp) at 1,800 rpm	2,100 Nm at 1,100 rpm
330 kW (449 hp) at 1,800 rpm	2,200 Nm at 1,100 rpm
350 kW (476 hp) at 1,800 rpm	2,300 Nm at 1,100 rpm
375 kW (510 hp) at 1,800 rpm	2,500 Nm at 1,100 rpm

OM 470: efficiency from a displacement of 10.7 l

Also new is the OM 470 in-line six-cylinder engine with a displacement of 10.7-litres, based on the OM 471 model series. It also has a number of technical features such as the unique X-Pulse injection system. The compact engine boasts a very high performance, and is also very efficient and at the same time weight-optimised.

Designed with a view to its specific areas of application, such as the payload-sensitive transportation of building materials, the OM 470 engine is approx. 170 kg lighter than the OM 471.

Tremendous tractive power at low engine speeds

The OM 470 has been consistently tuned for economy: the engine achieves a full 95 per cent of its maximum torque as low as 800 rpm. The maximum torque remains constantly available from 1,100 rpm through to 1,400 rpm. The engine almost achieves its maximum performance at this engine speed. Thanks to this characteristic, a high degree of power is available in the main operating range and the engine has real "bite". The long-stroke design with a bore of 125 mm and a stroke of 145 mm provides excellent pulling power.

Both the OM 470 and OM 471 boast a particularly long-life design. The crankcase, for example, is made of a special cast iron alloy, and the cylinder head of cast iron with vermicular graphite (CGI). The pistons, meanwhile, are made of steel to increase their service life and combat the loads caused by

ignition pressures of more than 200 bar.

The efficient gear drive which drives the two overhead composite camshafts has been completely redeveloped for the OM 470. It is located at the rear of the engine and is an important element of the engine's weight-saving design.

Unique: X-Pulse injection system

An important feature of all of the six-cylinder in-line engines of the OM 470/471/473 model series from Mercedes-Benz is the unique flexible common-rail X-Pulse injection system with fully electronic control and pressure booster. Whilst the pressure is increased to a maximum of 900 bar in the common rail, it is increased to an injection pressure of up to 2,100 bar in the individual injectors.

The rate of injection can be freely modulated depending on the operating conditions. As a result, X-Pulse minimises fuel consumption and at the same time maximises the smooth running performance of the engine. The injectors and shape of the combustion chamber have been adapted to the specific characteristics of the different engine variants.

Turbocharging takes place via a turbocharger with asymmetric turbine housing and fixed geometry. This process improves the engine response.

The engine brake of the OM 470 is just as powerful and efficient as the drive system. Mercedes-Benz uses a turbocharged decompression brake. It is operated via a three-stage steering column switch. The maximum braking performance is a remarkable 340 kW (462 PS).

Four versions of the OM 470 are available in the Arocs:

Power output	**Maximum Torque**
240 kW (326 hp) at 1,800 rpm	1,700 Nm at 1,100 rpm
265 kW (360 hp) at 1,800 rpm	1,800 Nm at 1,100 rpm
290 kW (394 hp) at 1,800 rpm	1,900 Nm at 1,100 rpm
315 kW (428 hp) at 1,800 rpm	2,100 Nm at 1,100 rpm

OM 936: compact and light, yet still powerful

The new Mercedes-Benz OM 936 in-linesix-cylinder engine is particularly light and compact. The new design features a number of technical refinements, such as a maximum injection pressure of 2,400 bar, common-rail injection or the world's first adjustable exhaust camshaft in a diesel engine.

The crossflow cylinder head with four valves guarantees the least possible flow losses. The cylinder head and crankcase are made of cast iron with lamellar graphite in a special alloy.

Even the "small one" is an undersquare engine

The choice of the bore-to-stroke ratio (110/135 mm) provides for optimum fuel consumption and guarantees high pulling power at low engine speeds. The compact, rigid gear drive of the camshafts is located on the rear side of the engine.

The turbocharging function is carried out up to an output of 220 kW (299 hp) by an asymmetrical exhaust gas turbocharger with a double-flow turbine. There is a two-stage supercharging process with two turbochargers for the two uppermost output levels.

Impressive performance and drivability

The OM 936 achieves an impressive performance. Specific output of up to 34 kW (46 hp) per litre of displacement propels the power units to a performance class previously only achieved by larger-capacity engines. It is this downsizing that provides one of the prerequisites for the favourable exhaust emissions and consumption values, and also the payload.

Besides the nominal data of the new engines, it is their ease of driving that impresses. At an engine speed of only 1,600 rpm, roughly 90 per cent of the maximum torque is already available. At the same time, the engines also display their dynamism at low revs. Within the main operating range, the maximum torque remains constant between 1,200 rpm and 1,600 rpm. However, the engines display high power output even at engine speeds below 1,000 rpm. Furthermore, the engines' spontaneous response to accelerator pedal movements is surprising in practice.

Whereas the standard version on the six-cylinder engines achieves up to 235 kW (320 hp), the optional high-performance engine brake achieves 300 kW (408 hp). Until now, only considerably larger engines have achieved values of thismagnitude.

The Mercedes-Benz OM 936 is available with five power output and torque levels:

Power output	Maximum Torque
175 kW (238 hp) at 2,200 rpm	1,000 Nm at 1,200 – 1,600 rpm
200 kW (272 hp) at 2,200 rpm	1,100 Nm at 1,200 – 1,600 rpm
220 kW (299 hp) at 2,200 rpm	1,200 Nm at 1,200 – 1,600 rpm
235 kW (320 hp) at 2,200 rpm	1,300 Nm at 1,200 – 1,600 rpm
260 kW (354 hp) at 2,200 rpm	1,400 Nm at 1,200 – 1,600 rpm

Effective engine brake

The engine brake acts just as effectively. Its performance, unique for an engine of this class, increases safety and the average transport speed, and at the same time minimises wear of the brake linings due to less use of the foot brake. The double synchronised decompression brake is based on the engines of the OM 470/471/473 series.

New engine generation with a great deal in common

Whether the OM 936, OM 470, OM 471 or the new OM 473 – all engines already comply with the Euro VI emissions standard. They feature Blue-Efficiency Power with common-rail injection, a closed particulate filter system and exhaust gas recirculation. Exhaust gases are treated by means of BlueTEC 6 featuring SCR technology with AdBlue injection, as well as a downstream oxidation catalytic converter and particulate filter.

Powerful primary retarder: braking system for inclines

All of the engines are available with the extremely powerful, turbocharged decompression engine brake. The driver can activate it in three stages via the steering column switch. Due to the considerably larger displacement of 15.6-litres, the engine brake on the OM 473 significantly outperforms its renowned, powerful counterpart on the OM 471: it achieves up to 460 kW (625 hp).

Engine series	Max. engine braking power
OM 936	300 kW (408 hp)
OM 470	340 kW (462 hp)
OM 471	400 kW (544 hp)

OM 473	475 kW (637 hp)

Maximum efficiency comes as standard in the new BlueEfficiency Power engine generation: all engines combine a spirited response and very smooth running characteristics with low consumption figures for fuel, AdBlue and engine oil. Equally present are exemplary environmental protection and long maintenance intervals.

Fully-automated transmissions as standard

Power transmission in all variants of the broad Arocs product range is implemented as standard by means of fully-automated, fast-acting Mercedes PowerShift 3 transmissions with eight, 12 or optionally 16 gears. They facilitate the work of the driver considerably, particularly with regard to tough manoeuvring or harsh off-road applications. As an option, regular manual transmissions with nine or 16 gears are available at extra cost.

The enhanced Mercedes PowerShift 3 automatic transmission is characterised among other things by shorter shift times, which are up to 20 per cent shorter compared with the previous Mercedes PowerShift 2 transmission, and even up to 50 per cent shorter compared with the Telligent automatic transmission. With its sensitive shift sensor system, the Mercedes PowerShift 3 ensures a precise selection of gears suitable for the respective driving and load conditions.

Smart sensor system for all situations

One feature is the ability to detect overrun mode on downhill gradients and as a result maintain the gear. The new crawl function (increased starting torque) with the integrated manoeuvring mode enables particularly easy moving off and precise, defined manoeuvring. In addition, different transmission modes and additional functions make driving in construction traffic simpler. The rocking-free mode, for example, enables vehicles which become stuck in muddy, boggy conditions to free themselves.

The direct-shift mechanism which enables direct shifting from first to reverse – without having to shift via neutral – is yet another advantage. For quick reversing, for example when working on motorway construction, particularly "fast" reverse gears are also available.

Two transmission modes to choose from: power or off-road

Depending on the vehicle type, the Arocs is fitted with off-road or power transmission driving programs, or as an option can also be ordered with the other respective driving program. Both driving programs each feature three transmission modes. Standard mode, including the standard eco-roll function, generally supports a particularly economical driving style for on-road use. Manual mode enables complete control of the Arocs in extreme off-road terrain.

In the power driving program's "power mode", gear changes are carried out with an increase in engine speed of 100 rpm compared with standard eco-roll mode. Power mode is automatically deactivated when no corresponding torque is available to be called upon.

The off-road driving program's "off-road mode" is characterised by the Arocs permanently having increased torque at its disposal.

Crawl mode for manoeuvring

Particularly important for short-distance haulage and construction transport, with its high share of low-speed driving and manoeuvring in restricted deployment locations, is the transmission's crawl mode:

when start-off or reverse gears are selected, the driver can control the speed of the new Arocs by means of the brake pedal alone. A further support feature when manoeuvring is the option to be able to shift directly from first gear into reverse.

Optional manual transmission

In addition to the standard automated gearshift, the Arocs is also optionally available with a manual double H-gearshift with pneumatic shift assistance. Customers who prefer a manual transmission therefore have a choice between a 9-speed transmission and three optimally tuned 16-speed transmissions. All transmissions ensure virtually loss-free transfer of power as well as ease of shifting and high levels of driving comfort.

New clutch generation

Both the standard Mercedes PowerShift 3 transmissions as, well as the manual versions, are used in combination with a new clutch generation featuring overload protection and a warning system. In the case of vehicles with one driven axle, the single-disc clutch helps to guarantee the transfer of torques of up to 2,600 Nm.

In the case of the Arocs with several driven axles and for torques up to 3,000 Nm, a double-disc clutch is used. It is also optionally available for vehicles with one driven axle.

Optional turbo retarder clutch or water retarder

In addition, the optionally available wear-free turbo retarder clutch provides maximum performance when moving off and manoeuvring with particularly high gross combination weights and torques. At the same time it also acts as a retarder and therefore helps to ensure additional safety.

For applications involving high proportions of continuous braking in the higher speed ranges, the optional secondary water retarder is recommended. It has a braking torque of up to 3,500 Nm and is offered as a first step for the engines of the 47x family. From October 2013 it will also be available for the OM 936 engine. Depending on the variant, it weighs 65 to 69 kg and in terms of its braking technology is fully integrated into the deceleration management of the Arocs.

In addition to safe continuous braking, the secondary water retarder also offers the advantage of being able to maintain the operating temperature of the combustion engine on long stretches of downhill driving. This provides perfect support for the complex emission control system of the standard Euro VI engines by helping to maintain the effectiveness of the cleaning technology at a high level.

A variety of axle options ex-works

The new Mercedes-Benz Arocs is being offered as a two-, three- or four-axle vehicle. The drive configurations on offer as part of the broad-based construction vehicle family range from the 4x2 two-axle vehicle through to the 8x8/4, a four-axle vehicle with all-wheel drive and two steered front axles.

The four-axle vehicle with one front and three rear axles is just one example of the wide variety of new Arocs vehicles now available ex-works. A further example is the 8x2/4 rigid chassis vehicle with two front axles, and one driven and one steered rear axle.

All-wheel drive: three types to cover all requirements

Besides the Arocs versions designed for use on surfaced roads with one or two driven rear axles, for off-road customers there are now three all-wheel variants to choose from offering optimised traction

for specific applications.

Engageable all-wheel drive offers good compromise

As standard and when the requirements in terms of payload and low consumption are greater than the need for traction, a second variant of the engageable all-wheel drive is available without off-road gear. With this, the front axle is engaged via the transfer case (VG 3000) when the vehicle is stationary, whereby the cardan shafts are fixed at the front and rear and rotate in the ratio 1:1.

Permanent all-wheel drive for off-road use

For applications primarily in difficult terrain and with high demands to be met, for example when moving off on inclines on unpaved surfaces, the Arocs can be optionally fitted with permanent all-wheel drive (VG 2800 transfer case with 100 per cent lock) plus additional off-road gear ratio.

Locks: always engaged

For optimum traction in each of the drive configurations in which the new Mercedes-Benz Arocs is available, a variety of differential locks is offered as standard depending on the vehicle type. They can be operated via a switch, always in the logical technical sequence: longitudinal lock, lock of the driven rear axles and – if fitted – lock of the driven front axles. In the case of an engageable front-axle drive, the engagement itself brings about the direct transmission of power.

In general, the all-wheel drive Arocs vehicles are fitted as standard with a disengageable anti-lock braking system. This enhances safety in heavy-duty off-road applications, because locking the wheels can cause a wedge-like build-up of soft surface material which can contribute to shorter stopping distances.

Power take-off units: even more choice

The range of power take-off units has been extended once again in the new Mercedes-Benz Arocs. The variants already available have now been supplemented with the addition of an even more powerful version offering 900 Nm on the engine.

Also new are an additional power consumption point at the front on the engine, as well as a clutch-dependent combination drive for use when the vehicle is stationary or whilst underway.

In general, all of the power take-off units in the Arocs can be combined with the standard, fully automatic Mercedes PowerShift 3 transmission, and also with the optional secondary retarder – a clear product advantage in the competitive environment.

Structure and suspension: two frames for different applications

Also targeted clearly at specific applications is the vehicle frame used in the new Mercedes-Benz Arocs. This component, which is crucial for off-road capabilities, payload and durability, is implemented in two variants in the case of the new vehicle family.

When it comes to use primarily on construction sites and off-road terrain, a frame measuring 744 mm wide and with a section thickness of eight or nine mm is used which is made of cold-formed, high-tensile fine-grained steel in conjunction with robust 100 mm-wide steel springs. This also guarantees a high load capacity and torsional flexibility, even under difficult conditions.

Strongly supported tandem

For tandem axle weights greater than 26-tonnes, for the first time a specific, heavy-duty tandem suspension with so-called flange socket bearings is used. Depending on the selected gross vehicle weight, the front and rear axle springs are fitted with two-, three- or four-leaf spring assemblies.

In the case of vehicles which are mainly for use on the road, the 834 mm-wide frame, which has been widened by 90 mm and features a frame thickness of seven or eight mm, in conjunction with the new four-bellow rear axle air suspension, helps to ensure particularly good ride comfort and good handling in both a laden and unladen state. Air suspension systems are now also available for the three- and four-axle versions of the Arocs.

New height: the Arocs provides good ground clearance

The requirements could not be any more different: while pure road vehicles such as the Mercedes-Benz Actros or the new Antos tend to need low frame heights for transporting large volumes, as a construction industry specialist the Arocs primarily needs ground clearance.

At a height of up to 1,120 mm, the frame of the new Arocs is 15 mm higher than the comparable Actros. This is the case for rigid chassis as well as tractor units. The off-road tipper and cement mixer chassis are 45 mm higher, depending on specification.

New position: axles moved towards the rear

The newly created range of wheelbases for two-axle vehicles is also always based on a front and rear axle repositioned by 60 mm towards the rear in each case. This enables the use of even the largest specialist tyres beyond the typical 13 R 22.5 sizes used in construction, without the need for any additional modifications.

In the four-axle vehicles, the two steering axles have each been moved by 60 mm towards the rear. The two rear axles are generally positioned a further 110 mm towards the rear. Here again there is an advantage to be gained in terms of the tyres used, and in addition the weight distribution is also more favourably balanced.

Making life easier for bodybuilders

To enable the efficient mounting of bodies, the frame features a 50 mm hole grid pattern, standardised mounting brackets, support blocks and attachment fixtures. Time savings and improved planning are also afforded thanks to the clearly defined mounting areas and positions on the frame of the new Arocs. Bodybuilders are able to fit accessories here such as support feet, compressors or instrument cabinets, without having to move equipment to create space for such items beforehand. Easily accessible connection points, such as the bodybuilder interface, are installed for the perfect connection of the body electrics and electronics.

A world first: Servotwin electro-hydraulic steering

Representing a world first in the commercial vehicle sector is the new Servotwin electro-hydraulic steering for four-axle vehicles. It features speed-sensitive power-assisted steering and active steering return. This newly developed technology, which is fitted as standard in heavy-duty vehicles and available as an optional extra in light-duty vehicles, opens up a world of previously unattainable steering comfort and maximum steering precision.

Brakes: always benefitting from full braking power

Depending on the area of application, the Arocs benefits from optimum deceleration performance – and therefore short braking distances – thanks to drum brakes, a combination of disc and drum brakes, or disc brakes on all axles. The all-wheel drive vehicles of the new Mercedes-Benz Arocs range are fitted with a disengageable anti-lock braking system as standard.

Driver's cabs: 14 variants to choose from

Even the selection of practical driver's cabs for the new Mercedes-Benz Arocs has reached a level of variety previously unseen in the construction sector. Construction vehicle customers have a choice of no fewer than seven driver's cabs in a total of 14 variants. The range comprises 2.3 m wide cabs featuring short or medium or long lengths and a variety of heights to accommodate ease of access and different engine tunnels. In addition, two 2.5 m wide cabs are available where more space is required.

Providing the edge in terms of handling: 2.3 m cab

The cab width of 2.3 m has proved to be extremely advantageous in a wide variety of applications for which the new Mercedes-Benz Arocs has been tailor-made. The compact design makes handling in short-distance haulage transport and on construction sites a great deal easier. In addition, the practical cab layout enables an integrated step-like entry design. This helps to reduce the workload of the driver significantly in applications involving him having to get in and out of the vehicle frequently, as is often the case in short-distance haulage and on construction sites.

Practical: 2.5 m BigSpace cab

When the application calls for it, the new Mercedes-Benz Arocs can also be equipped with wider cabs. As always with the new construction vehicle family, this is determined by the use to which the vehicle configuration is put.

In addition to the compact 2.3 m M-cabs therefore, long cabs can also be used for those applications which extend beyond a single day.

For such cases, the more spacious 2.5 m versions of the StreamSpace and BigSpace cabs, with level cab floors, are available.

Visually appealing: a powerful look for harsh applications

The new Arocs construction specialist has inherited some significant elements in terms of cab design from its colleagues, the Mercedes-Benz Actros and Antos. These include the typically expressive design idiom. However, the design of the new Mercedes-Benz Arocs remains exceptional and absolutely distinctive.

The specially designed styling of the construction vehicle family is characterised by its radiator grille with so-called "bucket-teeth" look. It sends a clear message: the sturdy "teeth" stand for biting one's way through and knuckling down to the job. With steel elements on the bumpers, a functionally designed underride guard and visually integrated flexible entry steps, this specialist in harsh applications achieves the ideal balance between form and function.

Operation: a top-class interior in every respect

The interior is geared towards vehicle use. The look is characterised by easy-to-clean, rugged surfaces finished in anthracite. The subtle contrast created with the black finish of the cockpit gives the

impression of a robust yet very high-quality interior.

The instrumentation of the Arocs vehicles is also of high quality. The multifunction steering wheel, instrument cluster and implementation of the switches completely follow the template found in the Actros designed for long-distance haulage. Thanks to its graphics-enabled 10.4 cm TFT colour display fitted as standard, the instrument cluster provides a quick and particularly comprehensive overview of all of the important information relating to the vehicle and its operating status. Additional information is also displayed, such as current fuel consumption and which differential locks are enabled for example. A 12.7 cm TFT display is optionally available, which can offer an integrated monitor for reversing cameras, avoiding the need to fit aftermarket devices.

Optimum seat ergonomics are guaranteed thanks to an entire selection of seating, as in the long-haul truck. As a result, a body-contoured seat with massage function is now also available for construction vehicles. The massage function available for the comfort and climatised suspension seats protects against strains thanks to inflating and deflating seven air cushions one after the other.

Profitability: ecology meets economic efficiency in the new Arocs

With the new Mercedes-Benz Arocs, construction traffic is becoming more efficient than ever before. This is because the new vehicle achieves a saving precisely where it counts: fuel consumption. The new Arocs is at least able to balance out the initially unavoidable increased consumption which is basically inherent in a Euro VI-compliant engine, compared with an engine using Euro V technology, thanks to its significantly more advanced technology alone. On top of this it also makes use of the Mercedes PowerShift 3 automatic transmission as standard.

Technology and training go hand in hand

Furthermore, driver assistance provided in the guise of the standard FleetBoard EcoSupport, and optionally available FleetBoard Performance Analysis, also help to save fuel.

In addition, for low overall costs the Arocs also features long, use-dependent maintenance intervals and a repair and maintenance-friendly design. The increased service life of many of the components, and not least the exemplary good body mounting ability, also help to increase the profitability of the Arocs.

All known safety systems available

The Arocs is transferring all of the safety assistance systems which have become familiar in the new Mercedes-Benz Actros into the construction vehicle sector.

Depending on the approval class of the individual Arocs model variants (N3 or N3G), standard and optionally available systems include the electronically controlled EBS braking system with disc brakes all round, ABS anti-lock braking system and the Electronic Stability Program (ESP). Also available as an option are Lane Keeping Assist and the latest generation of the unique Active Brake Assist 3, which is able to initiate full brake application when faced with stationary obstacles.

Top-of-the-range engine with performance for the toughest requirements

The new heavy-duty Mercedes-Benz OM 473 in-line six-cylinder engine

- **Top-of-the-range model of the BlueEfficiency Power engines**
- **Maximum performance level for demanding applications**
- **Tremendous torque at just above idle**

- **Systematically designed for low consumption**
- **Power ratings from 380 kW (517 hp) to 460 kW (625 hp)**
- **Technical highlights: turbocompound technology**
- **Instant response, consumption advantage at high load**
- **Extremely powerful decompression engine brake**
- **Tough, intense testing in overload mode**

Stuttgart - If an engine could be described as "heavier than heavy duty", the new OM 473 in-line six-cylinder engine from Mercedes-Benz would fit the bill perfectly. The technology of the new range-topping engine for heavy-duty trucks bearing the three-pointed star is based on the same platform as the ultra-modern Mercedes-Benz OM 471. But with an engine capacity of 15.6-litres, an output of up to 460 kW (625 hp) and up to 3,000 Nm of torque, the OM 473 stands apart from the rest, in a category of its own, characterised by peak performance under harsh conditions and meeting the toughest requirements in terms of transport speed, pulling power and robustness.

Top-of-the-range model of the BlueEfficiency Power engines

As the top-of-the-range engine, the OM 473 crowns the new BlueEfficiency Power engine generation from Mercedes-Benz. These medium-duty and heavy-duty engines now range from the compact OM 934 four-cylinder engine with 5.1-litre displacement for short-radius distribution vehicles to the new OM 473 for heavy trucks, providing a complete product line comprising five vertical engines and one horizontal engine with 21 power ratings altogether, ranging from 115 kW (156 hp) to 460 kW (625 hp). All engines already meet the Euro VI emissions standard. Only Mercedes-Benz offers such a wide range of ultra-modern diesel engines with such a range of power ratings.

Maximum performance level for demanding applications

High transport speeds even in demanding topography, large loads in European road traffic through to heavy haulage, top off-road performance and maximum durability – the new OM 473 is extremely effective. This becomes clear with the first glance at its performance figures: the output ranges from 380 kW (517 hp) to 460 kW (625 hp) and is already available in the main operating range. And at 1,600 rpm, the rated engine speed is unusually low. In the range of 1,500 to 1,700 rpm, and even beyond, depending on the variant, these engines have a nearly constant maximum output.

Tremendous torque at just above idle

Just as impressive is the maximum torque of the OM 473. Depending on the version, the figure is between 2,600 Nm and 3,000 Nm. Just above idle speed, approximately 2,500 Nm is available at a mere 800 rpm in all versions. That is a higher torque than the maximum torque achieved by most engines in heavy trucks.

Nominally, the highest torque is available at 1,100 rpm. In reality, nearly the entire pulling power is available over a wide range from roughly 900 to 1,400 rpm. Immediately thereafter, the engines reach their peak performance.

This characteristic produces excellent driveability over an extremely wide engine speed range. Moreover, all versions of the engine prove impressive with a response to accelerator pedal movements which is as eager as it is powerful.

Systematically designed for low fuel consumption

At the same time, the new Mercedes-Benz OM 473 provides surprising economic efficiency. The most powerful engine in the new engine generation was systematically developed for low fuel consumption.

For instance, depending on the version, the engine achieves between 0.5 per cent and 1.5 per cent lower consumption than the previous engine, the V8-cylinder Mercedes-Benz OM 502. Likewise, maximum environmental compatibility is ensured: all versions of the OM 473 meet the future Euro VI emissions standard.

Like all engines in the BlueEfficiency Power generation, the new OM 473 is produced at the Mannheim engine plant. Series production will begin in September of this year. The new OM 473 will be used in both the new Mercedes-Benz Actros and the new heavy-duty Mercedes-Benz Arocs construction trucks.

Power ratings from 380 kW (517 hp) to 460 kW (625 hp)

The new OM 473 is available with three power ratings:

Power	Maximum torque
380 kW (517 hp) at 1,600 rpm	2,600 Nm at 1,100 rpm
425 kW (578 hp) at 1,600 rpm	2,800 Nm at 1,100 rpm
460 kW (625 hp) at 1,600 rpm	3,000 Nm at 1,100 rpm

Thus the OM 473 provides a seamless continuation of the previous top-of-the-range version of the new engine generation, the OM 471 with its maximum output of 375 kW (510 hp), 2500 Nm torque and an engine capacity of 12.8-litres.

Technical highlights: turbocompound technology

Amongst the special features of the new Mercedes-Benz OM 473 is a technical highlight, known as turbocompound technology. It is one of the main reasons for the engine's high performance and economic efficiency.

The term turbocompound refers to a second turbine located downstream of the exhaust gas turbocharger. It makes use of the exhaust gas temperature which is maintained after the gas has flowed through the exhaust gas turbocharger, thereby further boosting efficiency. The power is transferred via a shaft and a hydrodynamic clutch to the engine's gear drive and thus directly to the crankshaft.

Instant response, consumption advantage at high load

The driver can feel the turbocompound technology directly by the even more eager response of the engine, even in the low rev range. At the same time, a consumption advantage of approximately two per cent is achieved at high load. These demanding conditions are typical for the range of application of the OM 473.

In support of maximum efficiency, a turbocharger with a full-flow radial turbine adapted to the high exhaust gas mass flow is located upstream of the turbocompound axial turbine. It is controlled by a wastegate valve.

Thoroughly rugged, long-lasting construction

Extraordinary ruggedness and longevity are amongst the requirements in the class of heavy-duty, high-powered trucks. The crankcase, made of grey cast iron with an alloy developed and patented at the Mannheim plant, has both horizontal and vertical ribbing and is therefore extremely stiff. The distance between cylinders is small to maintain a compact design.

The single-piece pistons are made of steel to ensure maximum durability. Thanks to minimal distortion

of the pistons and the stiff crankcase, oil consumption and blow-by losses are minimal – this lowers costs and improves environmental compatibility.

Efficient cooling with divided air flow

Wet cylinder liners ensure optimal engine cooling. The main air flow flows around the top third of the cylinder, while a smaller air flow is directed at the lower section of the cylinder liner, which is subjected to lower temperatures. Generally speaking, the coolant paths are short, resulting in extremely efficient cooling.

Highly stable cylinder head, distortion-free design

The single-piece cylinder head of the new engine is made of compacted graphite cast iron. It is highly stable and designed to withstand high ignition pressures of over 200 bar.

The material of the cylinder head and crankcase has the same expansion coefficient. This means there is absolutely no distortion between the components. The cooling ducts in the cylinder head are arranged in two levels. A precisely adjusted longitudinal flow complements the primary transverse flow.

Two overhead composite camshafts

The compact, stiff gear drive is situated on the output end of the engine. It is quiet, smooth and highly efficient in its operation. It drives the two overhead cams, amongst other things. These camshafts are composite and based on a hollow shaft – a first for engines of this size category.

Using low-friction plain bearing rocker arms in the crossflow cylinder head, the camshafts each control two inlet and exhaust valves per cylinder; these are arranged vertically in the head.

Variable X-Pulse fuel injection system

As in the other new-generation heavy-duty engines with the three-pointed star, the flexible common rail system with X-Pulse pressure boost is responsible for fuel injection in the OM 473. The maximum pressure of approximately 900 bar in the common rail is increased to up to 2,100 bar in the individual injectors.

The X-Pulse system used exclusively by Mercedes-Benz continually adjusts the injection specifically for each cylinder based on the engine's current operating conditions. Alongside the injection timing and amount, the injection quantity and the injection pressure, modulation of the individual injection characteristic (called rate shaping) is also possible. At the same time, the injection is extremely stable.

Combustion chamber and fuel injectors adapted to the engine

The combustion chamber in the piston crown of the OM 473 is shaped like a graduated bowl. Both the shape of the bowl and the geometry of the six-hole injectors are adapted to the special characteristics of the turbocompound system.

The result of this highly variable injection system with efficient combustion is a quiet, smooth-running engine, low fuel consumption and minimal exhaust emissions.

Extremely powerful decompression engine brake

The already familiar, extremely powerful pressurized decompression engine brake is also used in the

new OM 473. The driver activates the brake in three stages via the right steering-column lever, and it provides an extremely fast response.

Owing to the significantly larger engine size of 15.6-litres, the engine brake for the OM 473 clearly outperforms its high-output counterpart in the OM 471, developing up to 460 kW (625 hp).

Efficient exhaust gas treatment for the Euro VI emissions standard

In the new OM 473, as in the previously introduced OM 470 and OM 471 heavy-duty engines, cooled exhaust gas recirculation is used to achieve low untreated exhaust emissions.

Like all engines in the new-generation BlueEfficiency Power units, the OM 473 also has a highly efficient exhaust gas treatment system based on the Mercedes-Benz BlueTEC technology with SCR technology. A synthetic urea called AdBlue is added to the exhaust gas. In the SCR catalytic converter located downstream, harmful nitrogen oxides are converted to nitrogen and water, harmless components of the air. The consumption of AdBlue is very low, at two to three per cent of fuel consumption. This can be attributed to the engine's low emissions. And there is also a particle filter.

All components are specifically adapted to the OM 473. All three performance versions of the new engine meet the Euro VI emissions standard.

Weight commensurate with performance

The rugged new Mercedes-Benz OM 473 is relatively compact, at 1,425 mm long (without fans), 1,128 mm wide and 1,212 mm high. The weight according to DIN 70020-GZ is 1,284 kg, an appropriate weight for a heavy-duty engine of this size which already meets the Euro VI emissions standard for the highest of demands.

Systematically trimmed for economic efficiency

Customers will choose the OM 473 primarily due to its performance; even so, its developers paid close attention to maximum economic efficiency. Alongside the comparatively favourable fuel and AdBlue consumption, this includes factors such as long maintenance intervals for the engine of up to 150,000 km in long-distance haulage. The particle filter only needs to be cleaned for the first time at 450,000 km and thereafter only every 300,000 km.

The easily accessible filter module with oil and fuel filters, and the water separator for the fuel system on the cold side of the engine simplifies service – a further cost-reduction factor.

Longevity proven in practice

Extreme longevity is one of the essential points of economic efficiency for the new OM 473. It achieves a B10 value of 1.2 million km. In other words, at least 90 per cent of the engines achieve this value without a thorough overhaul. The engines have furnished proof of this not just during testing, but rather in practical applications on another continent.

Millions of kilometres in daily operation

The new Mercedes-Benz OM 473 is specifically designed for European requirements. But the engine benefits from extensive testing in North America, where for the past five years over 100,000 units of the same engine block have already been in use as Detroit Diesel DD 16 and 15 with two different engine capacities (15.6-litres and 14.8-litres).

This means a kilometre reading to date of many billions of kilometres in total. During this time, a number of engines have covered over a million miles (1.6 million km) of daily haulage in tough real-world conditions. The turbocompound technology amongst others has proven highly successful.

In Europe, only the larger 15.6-litres variant is used. It differs from the American powerplants by more than 200 parts. The different manufacturing plants – the units for Detroit Diesel are produced in North America – make the distinctions clear.

Tough, intense testing in overload mode

The European version of the engine was subjected to tough, intense testing on par with any new engine from Mercedes-Benz. Alongside extreme driving cycles in the Spanish Sierra Nevada and cold tests in Scandinavia, this includes endurance runs in South Africa. There it was tested, amongst other things, in the overload range with 60-tonnes of gross combination weight in semitrailer/tractor combinations with two semitrailers, in extremely rugged topography. By the start of production, the OM 473 will have covered around 18.5 million test kilometres in total – an impressive number.

In a subsequent step, the extremely durable engine will also be used in heavy-duty tractor units from Mercedes-Benz. It also serves as the basis for an industrial engine in the off-highway segment under the name MTU 1500.

More than 110 years of construction sector experience

From the Mercedes-Benz LK to the new Arocs

- **Carrying five-tonne payloads as far back as 1897**
- **LK 10000 already coping with 10-tonne loads in 1937**
- **Heavy-duty two-axle tipper for the 1950s**
- **Heavy-duty three-axle models conquered the market from 1964**
- **1971: first tandem planetary axle in the LP 2232**
- **A revolution in manufacturing: modular system introduced for New Generation models**
- **Increasing specialisation for Actros construction vehicles**
- **The new Arocs: a special class of truck for the construction sector**

Virtually every second construction vehicle in Germany boasts the three-pointed star on its radiator grille. Indeed, right across the world, Mercedes-Benz has long been the market leader when it comes to vehicles for the construction industry. The sector's traditional links with the three-pointed star date back many years: Mercedes-Benz these days has 110 years of experience in the construction field behind it. In the early days of the truck it was above all the brickworks and breweries that recognised its advantages – in defiance of the general air of scepticism that surrounded this technical upstart.

As early as 1897, in other words just one year after the invention of the truck by Gottlieb Daimler, the Daimler Motor Company launched a vehicle that would carry a payload of five-tonnes. The arrival of what became known as winched tippers in 1904 subsequently paved the way for the transport of heavy bulk goods: with the help of a crank and a toothed rack, it was now possible to tilt one side of the load platform upwards. With the correct crank ratio, two people could easily deal with a five-tonne load with just two winches per truck.

Things were still being done this way well into the 1920s, when the hydraulic lift ram began to take over from manual labour as a means of tilting the platform. At this point the three-way tipper was born: for with the hydraulic ram as the driving force, bulk goods could now be tipped off in three directions instead of just two, as had been the case until then.

The dedicated tipper however, as seen working on construction sites to this day, did still not exist. The structure used back then as a chassis by both the building industry and disposal companies was technically pretty much the same as that used for road-going vehicles with, at the very most, a shorter rear overhang or certain modifications to the suspension and frame to differentiate it.

Nevertheless: even that very first Daimler truck anticipated the planetary axles that are still used on construction vehicles today. The belt transmission transferred the engine power to a shaft mounted at right angles to the longitudinal axis of the vehicle. At each end of this shaft was a pinion that gripped the sprockets on the inside of a gearwheel, which in its turn was securely connected to the wheel being driven.

In the years running up to the war, tipper payload was gradually increased by Mercedes-Benz to 10-tonnes, as for example carried by the three-axle LK 10000 of 1937. Also known as the "Reichsautobahn-Strassendienstwagen" (or "state highway services vehicle") it featured a double-drive rear axle (axle configuration 6x4).

From 1949 onwards it was above all medium-sized conventional cab-behind-engine vehicles such as the LK 3250 and LK 3500 that came into their own as tippers working on post-war reconstruction. Heavy-duty two-axle tippers then rejoined the range in the mid-1950s, but it was not until the 1960s that Daimler-Benz once again built a three-axle model for the construction sector.

By the time those first heavy-duty three-axle models, with their 6x4 axle configuration, came onto the market in 1964, they found themselves up against established competition from a variety of sources. Such vehicles bore the name Büssing, Henschel, Krupp, Magirus or MAN: all of these brands were already offering a 6x4 or 6x6 by the time the short-nosed Mercedes known as the LK or LAK 2220 appeared on the scene. That these vehicles would ultimately become such firm favourites with drivers, above all in the Middle East and Africa, that they would go on to be used for a good 30 years, was something that very few people back then would venture to have predicted.

Robust concept: quality wins through

However, the LK 2220 of 1963 was designed from the outset to deal with the extraordinary challenges that it would go on to face all over the world. Not only did it feature a 154 kW (210 hp) engine that, in its day, was the most powerful ever fitted in a three-axle construction vehicle, but also a generously proportioned six-speed constant-mesh transmission and an exceptionally robust frame. The drive axles were configured to carry an axle load of 13-tonnes each, even though the maximum per axle housing on the road in Germany was eight-tonnes and no more than 10-tonnes even in off-road use. "Trucks you can trust" was thus a motto that was lived up to even then, above all in the construction sector.

A whole range of further refinements ensured that this new three-axle model was ideally suited for work in extreme terrain. The backbone of the vehicle was provided by an exceptionally robust fish-belly frame with riveted cross members, and which was somewhat wider towards the front than in the rear. Two lower and one upper maintenance-free control arms on each side bore the brunt of the driving and braking forces from the rear axles, which meant that the leaf springs had only to cope with the transverse and load forces.

Strategic realignment in the 1960s

The relatively late arrival of this short-nosed heavy-duty tipper on the market was not only due to the very thorough testing to which the new construction vehicles were subjected. This period between the late 1950s and the early 1960s saw the brand under the three-pointed star experiencing something of a reorientation phase as far as its truck strategy was concerned. The cab-over concept was still being

eyed with some scepticism and the company was making only cautious advances into the very heavy segment. The broad direction, however, was clear: the objective that Mercedes-Benz had set itself for its truck business from the mid-1960s onward was to become a high-volume generalist.

And so it was that, one after another, segments that had until now been neglected were gradually appropriated for the brand. Gaggenau – at that time the plant responsible for the heavy-duty models – was in the mid-1960s producing both cab-over-engine models (the LP series with cuboid cab introduced in 1963) and the short-nosed models that had first appeared on the scene in 1959. In parallel to this, the Mannheim plant was building medium-duty cab-over-engine and short-nosed models, while the new plant at Wörth had taken up manufacturing the light-duty LP 608 cab-over-engine model as a completely new product.

Only a very short run-in period was to prove necessary before both the novices in the product range – the very light-duty as well as the very heavy-duty –had worked their way up to become the market leaders in their respective disciplines.

Broad portfolio with increasing specialisation

The product portfolio of Mercedes-Benz was thus not only growing horizontally, but also vertically, as it were: that is to say in the form of increasing specialisation, as was now being seen more and more with the construction vehicles. Special tipper variants had been available for virtually all post-war truck models. But in terms of the actual construction specification, this generally quite simply included – as had been the case since the early days of the truck - a shortened rear overhang, modified frame and adaptations to the suspension.

The move to the three-axle truck with a double drive axle represented a first cautious step in the direction of a purpose-built specialist tipper as we might understand it today. There was however, for example, as yet no direct output shaft between the two rear axles. Instead, on the LK 2220, each of the two rear axles was connected by a separate shaft to the transfer case, which could if required also drive the front axle via a third shaft, so turning the LK 2220 into the all-wheel-drive LAK 2220.

The drive axles of these early three-axle models at this point did still not operate as planetary axles but instead worked according to a sort of precursor principle known as spur gear hub drive. This was already established technology – used, for example, in the classic post-war model L 6600 – and similarly used a two-stage process for the transmission of power: partly in the form of a conventional axle gear mounted centrally in the axle housing, and partly in the form of further spur gearing between the axle head and the wheel, via a large gearwheel linked to the hub. This same engineering approach and the same direct injection engines as for the short-nosed models were also used in the first cab-over-engine construction vehicles, with cuboid cab and 6x4 axle configuration, which took over from the short-nosed models in 1963.

Debut for a new family of components

Planetary axles, still widely represented among construction vehicles today, arrived on the market from 1971 onwards. They made their debut not in the short-nosed models, but in the cab-over-engine vehicles. Pre-empting the subsequent New Generation vehicles – and reflecting the requirement for eight horsepower per tonne – Mercedes-Benz introduced the new V10 in 1971. This vehicle had an output of 320 hp and featured the new planetary axles as well as a tilting, cuboid cab. Synchromesh transmissions were standard with these new variants, as well as a direct output shaft for the tandem planetary axle of the LP 2232 with its typical 6x4 axle configuration.

There were still two things missing in the product range at this time: on the one hand a cab-over-

engine vehicle with all-wheel drive, and on the other a short cab for the cab-over-engine units. The heavy-duty LP, for example, was only available with a medium-long or long cab. Although the LP was due to be replaced soon afterwards, an unusual interim solution was found that meant that it could be adapted for all-wheel-drive use: the cab-over-engine vehicle built by Hanomag-Henschel, which had recently been taken over by the company, was quickly fitted with Mercedes-Benz' own V engines, transfer case and planetary axles.

And so the axle configurations 4x4 and 6x6 were now also represented among the cab-over models, until the New Generation of 1973 heralded the arrival of a completely new and logically structured range of models in the hitherto rather bewildering field of the heavy-duty trucks. It was perhaps somewhat unusual that the construction trucks should be the first vehicles in a new model series to be introduced, but there was a plausible reason for this approach: the manageable numbers of construction vehicles meant that production in the Wörth plant, which had gradually been taking over building the heavy-duty range since 1965, could begin in a calm and controlled way.

Modular system for the New Generation

In manufacturing technology terms, the New Generation was part of one of the most radical upheavals in the Daimler-Benz commercial vehicle programme at that time. Having said that, the introduction of the so-called modular system marked a major and significant step forward for the company. For by this time Daimler-Benz had become one of the big names among heavy-duty trucks and had managed to achieve steady growth in its market shares – in the international markets as well. For the business year 1974, for example, the plan was to build 35,000 units in the heavy-duty sector. By comparison: the figure for 1965 had been just under 8,000 units. an increase, in other words, of almost 440 percent.

Despite the high level of demand, a period of economic difficulty was not far away. The oil crisis was just around the corner, commodity prices were on the rise and, to add insult to injury, floating exchange rates were making business very difficult. The answer to it all was to be the sophisticated modular system that lay behind the New Generation, which would meet the double challenge of the time head on: despite much-needed international diversification, market prices could be kept at a fair level. Development chief Arthur Mischke summarised the approach in a single sentence back in 1974: "The modular system was applied so systematically that we were able to build the maximum number of models to suit all transport requirements using a minimum of assemblies and components."

Just 650 components were required for the new V engines used in the 400 series, compared with 1,600 for the previous range. Similarly, only 220 parts were needed for the new planetary axles, as opposed to the 480 used for the two previous axle series. Standardisation and thus a higher level of automation also provided the scope to increase the dimensions of such components and so improve their durability.

Standardisation creates scope for further diversification

The way was now free for the construction vehicles – where necessary – to forge their own path. One example of something that was retained was the tried and tested fish-belly frame. Customers had a choice of three final-drive ratios for top speeds of 75, 85 or 95 km/h. The vehicles of the New Generation were braked by pivoted brake shoes with a drum diameter of 410 mm, which were used uniformly on all the axles. For the all-wheel-drive variants Mercedes-Benz also added an enhanced ALB system (automatic load-sensitive brake pressure control), which now also acted on the front axle brakes rather than just the brakes on the rear axle(s).

While the suspension mounting for the three-axle construction vehicles was already a familiar design, the cabs acquired an all-new cab suspension system: at the front the cab was mounted on two pivot

bearings with flexible rubber bushings. At the rear the cab was softly sprung on dampened spring struts, ensuring a low level of vibration. The particularly high tilt angle was a welcome addition for workshop personnel, as it afforded very easy access to the engine and ancillary units.

The driver was easily able to carry out daily checks via flaps in the front end. Peace and quiet in the cab was ensured by the cab-mounted gearshift: when the cab was tilted, the steering and gearshift linkages extended telescopically. For the first time, the shift lever thus had a fixed place in the cab, which itself was very effectively insulated against noise, heat and cold. The cabs of the New Generation now offered better ease of operation and more passive safety than ever before. Initially available in two variants - short or long – a medium-long variant was introduced in 1977.

Construction vehicle programme continues to expand

When, with effect from 1986, the precise gross vehicle weight of 32-tonnes became permissible for the four-axle model (previously: 30-tonnes), this category of vehicle would come to prove very popular with customers. It was initially built by specialist firm NAW, a company subsidiary based in Arbon, Switzerland, but production was later taken over by Wörth.

In the 1990s, by which time the New Generation had become the SK range, the construction vehicles too could be fitted as an option with the comfort cab suspension from the long-distance vehicles. At the same time the maximum engine output rose to the once unimaginable figure for this sector of 320 kW (435 hp).

By the time the construction vehicles produced under the New Generation, New Generation 80 and SK names were succeeded in 1997 by the construction variants of the new Actros, an impressive 24-year production period lay behind them.

Added refinements for Actros construction vehicles

The Actros construction vehicles would retain their dependable and robust characteristics, as well as the planetary axles, but added to these a growing number of technical refinements: the highlights of the new Mercedes-Benz construction vehicle range included parabolic instead of trapezoidal springs all round, a hydraulic/pneumatic gearshift, a new front-axle load compensating system for the four-axle models and, last but not least, off-road EPS as an option.

The automated transmission became a standard feature as early as 2003 with the introduction of the second-generation Actros in the construction vehicle sector. The high-quality feel and impeccable workmanship of the new, ergonomically designed interior pleased the drivers, as did the new air-conditioning system and the now-standard Telligent braking system – disc brakes were increasingly becoming the norm. Operators soon learned to appreciate the fact that the maintenance intervals were now twice as long.

The addition of high-payload Axor variants, with narrow cabs and in-line engines, to the Mercedes-Benz construction vehicle range from 2004 onwards was soon followed by an off-road version of the Actros 3 in 2008. Protective plates for the engine, radiator and tank meant that it was better equipped than ever before to cope with the risks inherent in rugged, off-road use. The 16-speed Telligent automated gearshift ceded to the new PowerShift Offroad automated 12-speed box. Further refinements that were now part of the standard specification included a battery charge indicator, a compressed air connection point inside the cab and roller sun blinds on the side windows, as well as a useful folding table for the front-passenger seat.

The new Arocs: a special class of truck for the construction sector

Their successors have now arrived in the shape of the new Arocs model series, a special class characterised not just by a new name. With a new "bucket-teeth-look" radiator grille as well as a new cab interior, the Mercedes-Benz construction vehicle is clearly forging its own way forward from now on.

Whereas the New Generation saw the road-going models and the construction vehicles staying more or less in step with one another, the two categories of vehicles will diverge significantly from now on: planetary axles, for example, no longer play a significant role in today's road-going vehicles, but their robustness means that they remain the preferred option in the construction site environment.

The specialist capability that is demanded today once again sets far greater limits on the development of uniform solutions for many components than was the case in the days of the New Generation. While back then the remit was to achieve the requisite diversification through standardisation, the challenge today is to control the centrifugal forces of increasing specialisation on the basis of higher volumes and global scale.